ASCoT FY00 Quarterly Status Report - June/2000

RTA 522-31-21-07 / Aerodynamic Shape Optimization for Design / E.J. Nielsen

NASA

Objective:

- Aerodynamic and aero/structural shape optimization using high fidelity physical modeling with automatic determination of error bounds on the cost functions and non-heuristic adaptation methodology.

Approach:

- Unstructured Euler/Navier-Stokes methodology will be used where the sensitivity derivatives are obtained using an adjoint approach. In addition, methodology under development at MIT also uses the same adjoint variables for the error analysis and adaptive mesh criteria so that simultaneous design and mesh adaptivity should be possible.

Milestones: qtr/yr

- Assess 2-D adjoint methodology for error estimates and adaptive criteria using FUN2D   (3/00)
- Investigate SATO procedures for Navier-Stokes design with many design variables   (6/00)
- Apply 3-D design methodology to sample configurations such as the blended wing/body or box wing   (9/00)
- Simultaneous design/adaptation for 3-D turbulent Navier-Stokes on a complex configuration   (9/02)

Status:

- Working towards 9/00 milestone

Issues/Concerns:

- Loss of work package lead (Anderson) to private sector creates serious strain on resources
- Robust adjoint solutions, memory/CPU requirements remain a concern

Recent Accomplishments:

- Parallelization of 3-D design environment complete for inviscid, laminar, and turbulent flows
- Implemented linear elasticity mesh movement scheme; results very encouraging
- Implemented second-order preconditioner for 3-D adjoint solver
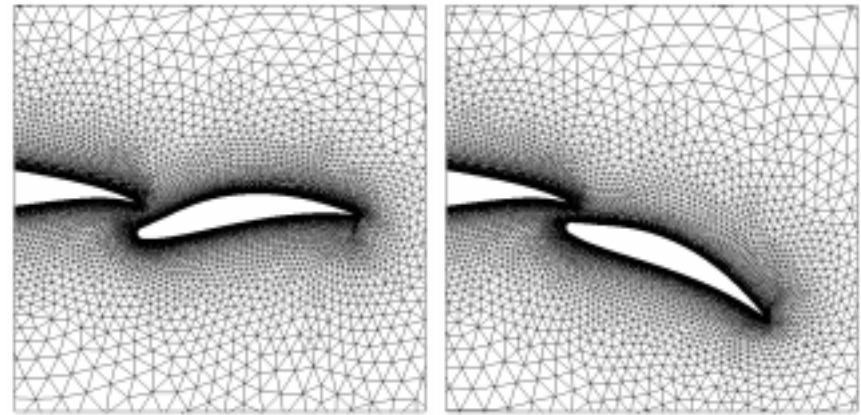
FY00 Spending Plan / YTD Commitments / FTEs

Description	Plan, $K	Commit. $K
Total	**0**	**0**

C.S. Name	Org	FTE
Nielsen	RBC	1.0
		1.0